2011

Rethinking the Tenets of Business-IT Alignment

Michael Boahene
University of Melbourne

Rethinking the Tenets of Business-IT Alignment

Michael Boahene
Dept. of Information Systems
University of Melbourne
Melbourne, Australia

Abstract

The issue of Business-IT Alignment has been a high-ranking topic in almost every survey of executives' concerns since the inception of such surveys. However, despite extensive research, and numerous explanations and recommendations, it would appear that, the concern about Business-IT Alignment still remains, at least in the minds of executives. This position paper explores ideas regarding information and system, as an alternative to the behavioural and governance streams of inquiry which dominate Business-IT Alignment research. It argues that while progress in the alignment realm has been made in respect of favourable behavioural factors within and between Business and IT organisations, as well as governance of IT interventions, the concerns have persisted because, IT interventions continue to focus attention on closed application and computer systems whose ascribed purpose are the mode and medium of interaction respectively. This is at the expense of an information system – the means of interaction – which is open, ongoing and subsumes both of these systems.

Keywords

Business-IT Alignment, Complexity, Information, Systems, Human Activity Systems.

INTRODUCTION

The issue of Business-IT Alignment has been a high-ranking topic in almost every survey of executives' concerns since the inception of such surveys. Luftman (2000) for instance traces these concerns to the late 1970s, and as his 2007 survey shows, it remains a key issue for business executives. Not surprisingly, the issue has drawn the attention of researchers to come up with a resolution. Tan & Gallupe (1999) identify research dating back to 1980, which would indicate that researchers have been active in this area of concern for some time. However, despite extensive research, and numerous explanations and recommendations, it would appear that the concern still remains, at least in the minds of executives.

Prominent in a majority of the Business-IT Alignment research literature, is reference to the Strategic Alignment Model for IT (*product*[1]) enabled organisational transformation, made famous by the work of Henderson and Venkatraman (1990). Their research was based on the pivotal premise that, the role of IT (*products*) in Business organizations has shifted beyond its traditional, back-office support, toward an integral part of the strategy of these organizations. The model defines two domain types, distinguishing between Business and IT organizations on the one hand, and Internal and External orientation on the other. This yields four quadrants, which together, encapsulate what the authors' view as externally oriented (i.e. strategy) and internally oriented (i.e. infrastructure) functions in each respective domain.

They propose a simultaneous need for strategic fit between the external and internal quadrants within the Business and IT domains, as well as, functional integration between the respective internal and external quadrants across each of the domains, as a pre-condition for strategic alignment. However, a closer examination of the research paper reveals that it:

- takes a popular but erroneous view of IT products, which emphasize hardware and system software capabilities while taking the relevance of assumptions related to business organising ideas, concepts and interaction rules that are ultimately codified in the associated application software, for granted;

- confuses 'strategy' with 'strategic', by implying that IT (*products*) in the respective internal quadrants cannot not be considered strategic since they fulfil so called administrative and operational roles. However, while strategy emphasizes intended actions (i.e. cause), strategic refers to outcome and impact (i.e. effect) of actions, which are profound and difficult to reverse. Therefore any IT product, whether internally- or externally-focused can be strategic in so far as its outcome, and particularly impact, are difficult to reverse;

[1] My emphasis, since the research paper does not make clear whether it is referring to organization, function or product when it uses the term IT

- provides no indication of the preferred knowledge, processes and skills required to achieve alignment, even though it sets out to address, in its own words, the business (external) and organizational (internal) requirements of transformation, enabled and shaped by new powerful I/T capabilities.

Notwithstanding, researchers have tended to take the Strategic Alignment Model as given, while focusing on behavioural factors (Chan 2002; Luftman 2000; Reich & Benbasat 2000; Silvius 2007) that promote such alignment.

Tan and Gallupe (1999) have further noted that, a review of the extant Business-IT Alignment research published in IS Journals between 1980 and 2000 revealed that there were no published conceptual or empirical works taken from a cognitive perspective. This is surprising, when we consider that, the processes of IT interventions (e.g. problem investigation, solution transformation and progression functions) and their outcomes (i.e. designed processes, software and hardware), are primarily conceptual, and require a shared cognitive filter, epistemology and target systems archetypes to effectively instantiate.

Perhaps it is timely to re-examine the beliefs and assumptions that underlie the current practice of Business-IT Alignment. In particular, the paper focuses on paradigmatic assumptions regarding the notion of *information* and *the nature of systems* produced and implemented as a result of IT interventions. These two are chosen because they are fundamental concepts that set the worldview of practitioners in IT interventions. The argument in this position paper relies on the following insights regarding *information* and *system* respectively:

1. The term *information* is currently taken, as used in everyday conversation, to refer to a state in which a recipient has attributed meaning to an observation or codified message, however in relation to systems, it is better thought of as an information generation process in which humans have the unique ability of attributing meaning to potential information
2. A *system* is not innate, but rather a socially constructed phenomenon in the sense that it is perceived and agreed to, by people.

These insights however presuppose the existence of an environment, consisting of 'things', about whom information is generated, and from which systems are perceived, exist and manage their survival. Therefore, prior to discussing ideas about *information* and *system*, the notion of an environment in which they are conceived, is explored in the next section. This is followed by establishing the ascribed purpose(s) and membership of the different types of systems that are relevant in Business-IT Alignment. It concludes by arguing that each IT intervention requires separate consideration but simultaneous accommodation of three distinguishable, yet intricately related types of systems (i.e. *means, mode, medium*) while referencing a fourth – the targeted business organisation. However, at the moment only two of these system types (i.e. *mode, medium*) are consciously and consistently focussed on.

TARGET ENVIRONMENT

When we set out to intervene in a situation that is considered problematic and, for whatever reasons invest in resources to overcome the problems, those very reasons tend to mark out the boundaries within which our effort is focused and the acquired resources are expected to function[2] and have an intended effect. The area focused on is referred to as a target environment. As shown in figure 1 below, resources in any environment that is targeted may be any combination of inanimate (e.g. solids, liquids, gaseous material), biological (e.g. people, animals, plants) and abstract (e.g. phenomena) resources.

In this targeted environment, we articulate intentions and set purpose(s), determine relevant resources and their desirable capabilities and, on that basis conceive systems that we expect to function according to those ascribed[3] and intended[4] purposes.

[2] A function represents the ongoing working together of chosen elements within a targeted environment or any bounded area, to fulfill or contribute to fulfilling the ascribed, as well as, intentional purposes of a perceived system. A function is not an element in itself, but rather what, together, the elements do.
[3] Ascribed refers to the purpose(s) for a defined system archetype.
[4] Intended refers to the purpose(s) for a particular instance of that system archetype.

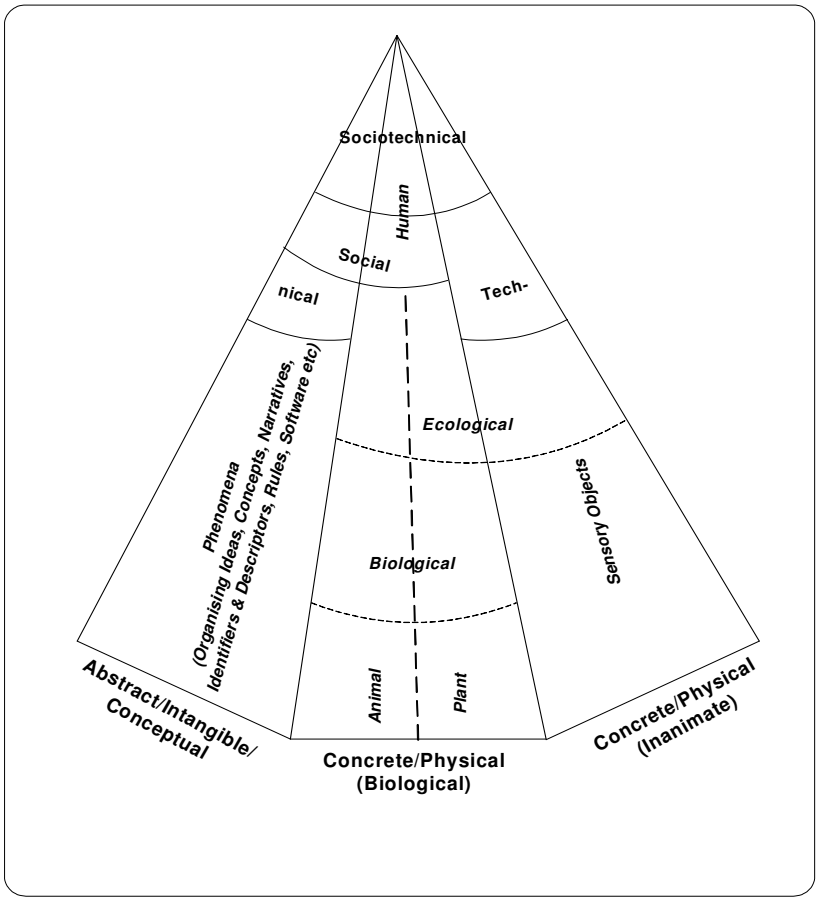

Figure 1: Source of System Elements in a Target Environment

SYSTEM IDEAS

As pointed out by Reynolds & Holwell (2010, page 7) systems are not innate but rather, conceptual constructs used for engaging with and improving situations of real-world complexity. The idea of a *system* therefore represents a way of thinking about, and seeing the inter-relationships between chosen resources, so the complexity (i.e. variety and subjectivity) inherent in the dynamics that is paid attention, can be organised and managed.

This means that everyone has the freedom to perceive a set of resources as constituting a system. But in their assigned roles, the chosen resources have to be shown as working together to achieve emergent properties (akin to ascribed and intentional purposes), which pertain to the system as a whole. As a sign of working together, some of the chosen resources must, in addition to their other desirable capabilities, be able to communicate or exchange other resources with each other.

Figure 1 above, shows that technical systems typically consist of inanimate and abstract resources, social systems consist of biological (particularly humans) and abstract resources, while socio-technical systems consist of all three. With respect to system membership, a clear understanding of the terms *element* and *component* is essential. They are often used interchangeably however each describes a different formative view of the parts of a perceived system, as explained below.

Elements

Elements are the irreducible resources that form a perceived system. Elements usually permeate the whole system in a similar way that the ingredients of, say, a banana cake are indivisibly present throughout the cake. Each element is chosen for their intended contribution in meeting the ascribed and intentional purpose(s), of the perceived system. Therefore for each system, the elements include the resources that do the communicating as well as those that are exchanged.

Components

Components, on the other hand, are divisions of a perceived system, similar to the pieces of a jigsaw puzzle. Contrary to popular belief, components are not the same as elements. The components of a system are similar to

rooms in a house (e.g. bedroom, kitchen and bathroom). The potential elements of a house include the materials (e.g. wood, bricks, mortar and nails) that are used to construct the components. Each component may contain one or more elements that constitute the perceived system and, an element may appear in one or more components.

Components provide specific functions that contribute to fulfilling the ascribed and intentional purpose(s) of the perceived system.

While there are many classes of systems (e.g. climatic, ecological etc.) that may be perceived, this paper focuses on systems of human activity and those that facilitate information interactions within them.

ORGANISED HUMAN ACTIVITY

Human activity systems, an idea drawn from the work of Checkland & Howell (1998), are intentional and inter-connected sets of activities that humans engage in with a purpose in mind. It must be remembered that the purpose(s) of perceived systems are not innate, but rather human ascribed; in other words, socially constructed.

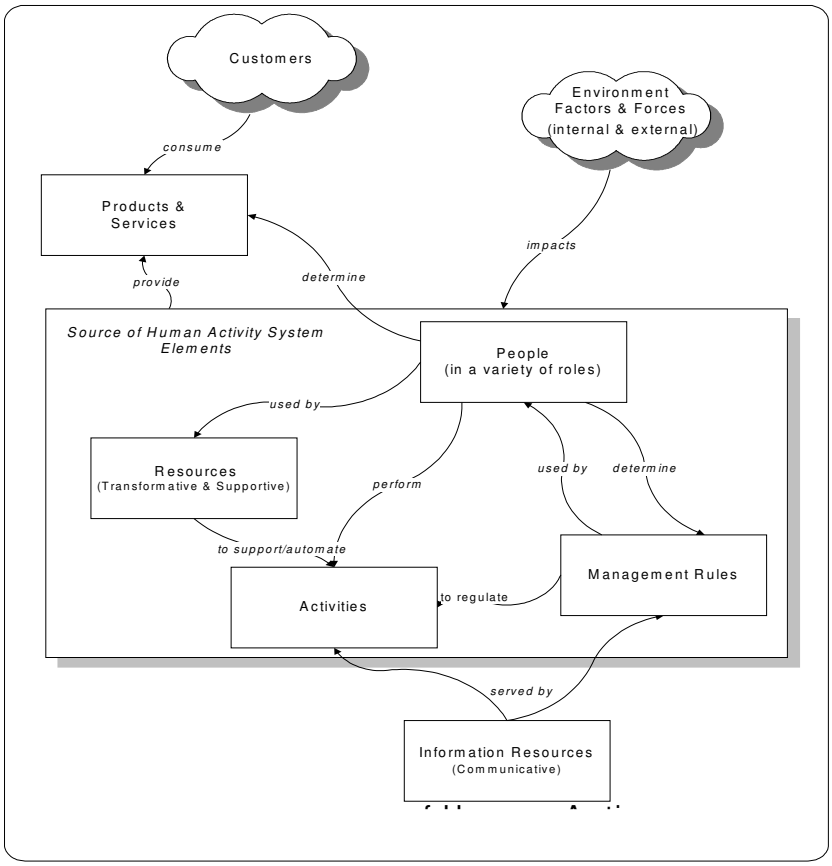

Figure2: Alignment of Human Activity System Functions with Information Resources

In a broad sense, the purpose of human activity systems is to create products and/or provide services, of one kind or another, to consumers. These products and services are provided through a series of activities that are linked together by communicative resources (e.g. potential information). People, and sometimes machines, undertake these activities, using supportive (e.g. tools and equipment) and transformative resources (e.g. raw materials). In each situation, however, the actions of people engaged in the activities are governed by particular management rules, whether written or unwritten, tacit or explicit. While management rules are intended to govern the way people undertake activities, they achieve this intention because of the willingness of people (whether by coercion, consensus, accommodation or toleration) to accept and abide by certain social rules, rather than they being natural laws, hence the openness of these systems.

Figure 2 above provides a framework that helps facilitate inquiry into a targeted environment to identify and select desired elements with which to form a human activity system. It also aids the teasing out of their alignment with the information resource capabilities required to serve the interaction needs of that system. Referring to figure 1, it can be deduced that human activity systems could be classified as social or socio-technical systems, depending on participating resources.

With respect to Business-IT Alignment, both the Business and IT organisations can be thought of as human activity systems however, each is perceived with different ascribed and intentional purposes. The Business organisation is responsible for the provision of products and services to consumers, while the IT organisation is responsible for the orderly provision of information resources to facilitate actions and interactions required by the Business organisation to fulfil its intentional purposes.

Irrespective of the system's intentional purpose however, there are forces originating both internally and externally that continually exert pressure on the environment, thus influencing choices and actions that keep the system viable. Due to the nature of these influences, the behaviour of elements in the targeted environment (e.g. organisations, or groups within organisations) in which human activity systems are formed, operated and managed, are usually dynamic, and so are the intentions that give purpose to these perceived systems.

To ensure the continued viability and sustainability of such systems, strategies are formulated and implemented to counter or, take advantage of the potential effects of the forces that act on the perceived human activity system. In essence, the strategies are a response to dynamic forces that are perceived to be exerting, or expected to exert pressure on the human activity system. Strategies such as offering new products, competing in new markets or devising alternative preferred ways of delivering products and services are pursued.

In pursuing a particular strategy, forces that affect any of the chosen elements in the perceived human activity system have the potential to result in the demand for new information generation, manipulation and/or access capabilities. This brings into focus information interaction elements and information availability possibilities previously not considered in the functions undertaken to produce the products and/or provide services, while at the same time making others now in focus, redundant. Managing this dynamic and ongoing transition of information resource needs is the challenge for Business-IT Alignment.

INFORMATION GENERATION

Information is a fundamental concept in IT however it is often misapplied and therefore requires clarification here. There is an active process of information generation, which is often taken for granted when considered in light of the seductive capability claims of information technologies. As a concept, the term *information* can in fact be used to refer to both the generative process, and a particular state in that process – post-meaning attribution.

To generate information, one goes through an active perceptive process, whether consciously or sub-consciously, of first observing or thinking about *'things'*. We observe by means of sensory perception. Then use another kind of perception – cognitive – that enables us to organise the observation into a recognisable idea that is meaningful. To the observer, this attributed meaning constitutes *information*. What is cognitively recognised usually emphasise aspects of the observed situation that the observer is interested in and therefore, becomes aware of.

The emphasised aspects of the observation, which is the observer's information, can subsequently be shared with others, using codified signs, arranged as tokens or codes. These codes, chosen by the observer for their potential to convey his/her intended meaning, are transferred through a medium in the form of messages. To the recipient, this constitutes potential information. The messages are then interpreted by the recipient, who through cognitive perception also attributes meaning to them. The meaning, which is attributed to the codes that were exchanged, also constitutes information, but this time, to the recipient.

In this process however, what is observed, the meaning attributed to it, and what is conveyed to others, as observed, may not always be one and the same – the crux of the challenge for information resource provision in Business-IT Alignment. For information technologies, this process immediately raises two difficulties, because of the dynamic human-dependent actions required for:

- Choosing which aspects of an observation to emphasise, and therefore, codify
- Attributing meaning to the codes, representing an observation, which are exchanged

INFORMATION RESOURCES

Information resources, which the IT organisation is responsible for providing, can be perceived as systems consisting of both conceptual and tangible resources that enable the generation and exchange of potential information between people, and sometimes machines, engaged in purposeful activities in the targeted human activity system.

As shown in Figure 3 below, the conceptual resources consist of *organising ideas* that can be further categorised into *rules* and *information concepts*, while the tangible resources consist of *stakeholders* in a variety of roles.

When organised, the stakeholder participants (i.e. people and physical resources) provide and\or use the conceptual resources to enable the generation of information processing capabilities and potential information. The potential information is exchanged within and between different participants, using processing capabilities, thus forming an information *interaction* system.

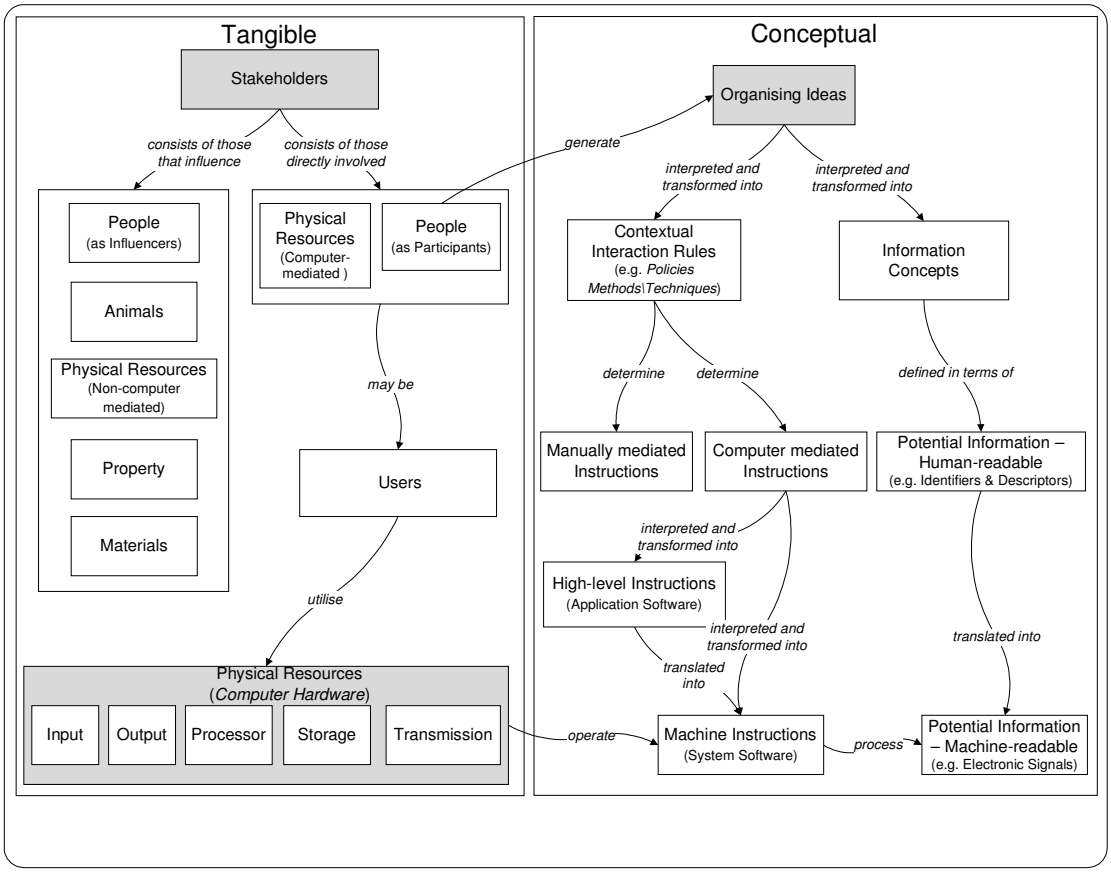

Figure 3: Source of Information Resource Elements

Information Resource Systems

Information *interaction* systems can be presumed to have existed for as long as humans have had a need to collaborate at work or leisure, and share thoughts, observations and experiences with each other. As an integral part of the social fabric of human activity systems, it serves as the conduit for interaction, and supports the organisation and management of complexity within the system that it serves. As a result of this role relationship, a human activity system can be referred to as a *served* system, with the information *interaction* system being the *serving* system. In their capacity as serving systems, information *interaction* systems do not represent the arms and legs or even the brain or heart of the human activity systems. They are rather the nervous system, connecting all the 'organs' of the human activity system.

In its fullest sense, information *interaction* systems cover every exchange of potential information regarding concepts that pertain to the human activity system's elements, dynamics and subjects of interest. It also covers all concepts that pertain to the forces that influence the way elements of a human activity system work together, and with the external environment.

Concepts regarding the elements, forces and their dynamics form the sources from which potential information may be generated to serve the interaction needs of the targeted human activity system, as they become relevant. Their suitability and effectiveness however, depends on context, in this case, the needs of the human activity system in which they participate and are expected to fulfil the role of a sub-system that is responsible for information *interaction*.

Although the capabilities of an information *interaction* system by no means guarantee the survival of a human activity system, they can, if effective, significantly contribute to the potential of sustaining its viability. The outcomes of an information *interaction* system can therefore be considered a capability that emerges, in conjunction with other capabilities of the *served* human activity system, to ensure its survival.

Information Resource Systems Hierarchy

To enable a consistent and coherent management of the flow of potential information throughout a human activity system, it is necessary to further distinguish between the *means, mode* and *medium* that make the generation and exchange of potential information possible. Separating the *means* capability from the *mode* and *medium* capabilities respectively, is an essential distinction aimed at facilitating an appreciation of the complexity of conceiving and managing the introduction and operation of integrated information *interaction* systems that are aligned with the served Human Activity System.

The *means* represent the ideas intended to be exchanged, while the *mode* and *medium* represent the form and mechanism of exchange, respectively. Each of these needs to be organised and managed as a distinct system that serves the human activity system's interaction needs. For example, the *means* by which the expected departure and arrival of flights is shared with interested parties, in a human activity system that manages the operation of airline flights, may be via a concept, such as, schedule. The *mode* by which the schedule is communicated may be a list of departure and arrival times of flights, while the *medium* by which the schedule is communicated may be via an electronic screen, handwriting on a noticeboard, or even publication in a newspaper.

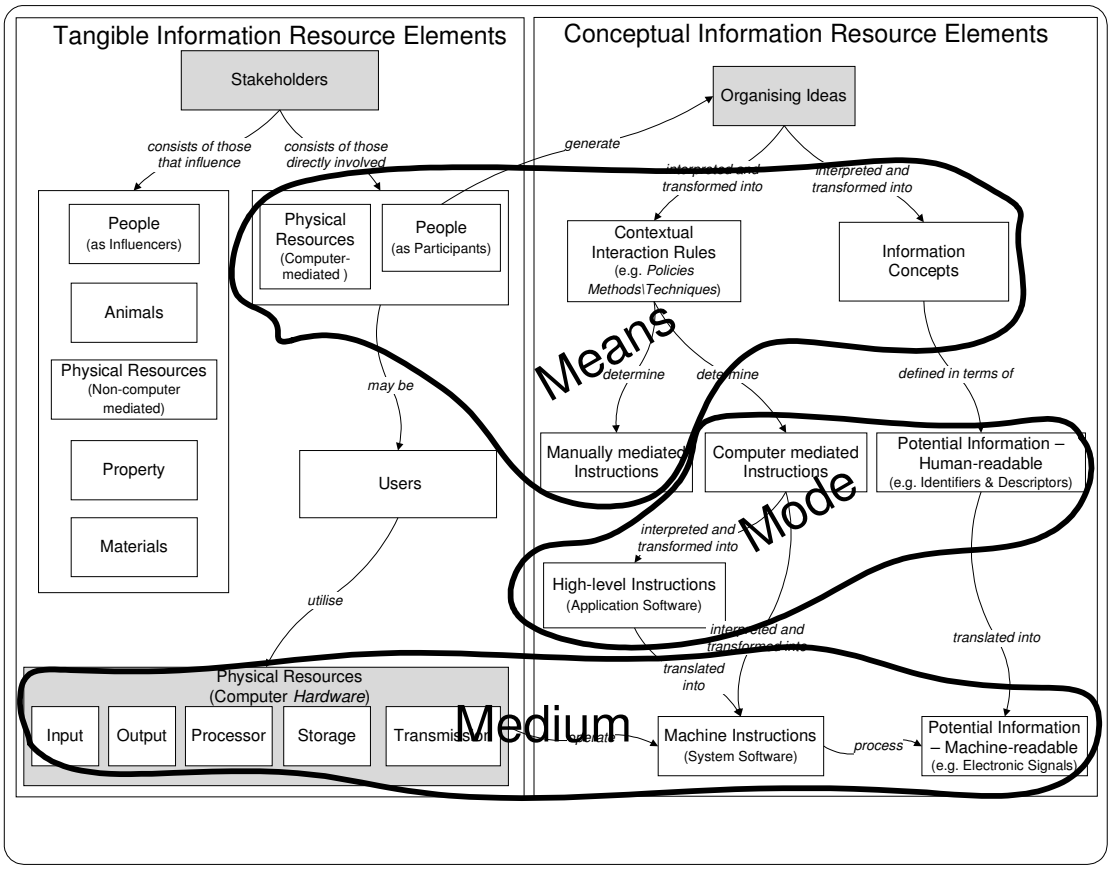

Figure 4: Information Interaction Systems Elements

The *means*, *mode* and *medium* capabilities are separate and distinguishable, and can be perceived as systems in their own right, with different ascribed purposes. They are however, intricately related by their contributions to the interaction capabilities sought by a served human activity system. Superimposing these ascribed purposes as shown in Figure 4 above, the:

- *Means* of interaction represents an information system, with elements consisting of people, context-based rules and information concepts (i.e. semantics)
- *Mode* of interaction represents an application system, with elements consisting of computer-mediated high-level instructions and potential information (i.e. syntactic), while
- M*edium* of interaction represents a computer system, with elements consisting of hardware, computer-mediated machine instructions and machine-readable potential information

Characteristics

Based on the potential elements and ascribed purposes, it can be deduced that an information system is open, because the capabilities required of its elements can often be spontaneously adapted to cope with changing (i.e.

dynamic) circumstances in the served human activity system. It therefore takes on the behaviour of the served human activity system, which is dynamic and ongoing.

It can be similarly deduced that both application and computer systems are closed because, having selected and organised its elements, the capabilities afforded by the resulting *mode* or *medium* of interaction cannot change, unless redesigned and reprogrammed. Both application and computer systems exhibit characteristics of a closed system, with utility that is limited to codified capabilities that are predetermined and static.

A core difference between information systems on the one hand, and application and computer systems on the other is that in the former, stakeholders (i.e. people), with their dynamic capabilities as well as needs, are participants, while for the latter, they are users, not participants, of the system. When cast in the light of Figure 1, it becomes apparent that information systems are socio-technical, while application and computer systems are technical.

When we consider that the *medium* of interaction derives its elements from the *mode* of interaction, which in turn derives its elements from the *means* of interaction, as shown in Figure 4, it can be said that structurally, an application system (i.e. mode) subsumes a computer system (i.e. medium), and is in turn, subsumed by an information system (i.e. means).

INFORMATION RESOURCE MANAGEMENT

The effort required to intervene in problems or opportunities and introduce an efficient and effective information *interaction* system usually involves many people. As such, the intended meaning conveyed through the exchange of messages between participants charged with this responsibility, needs to be based on an expectation of shared knowledge, which is adaptable to the variety exhibited in the:

- Ontology[5] of the served human activity system, as well as the information system and its sub-systems, on the one hand, and the
- Chosen approach (i.e. epistemology), to develop and introduce such systems, on the other.

Ontologically, the 'Zachman Architectural Framework (ZAF)', 'The Open Group Architecture Framework (TOGAF)' and its derivatives are still popular within IT organisations. However, one of the major failings of both frameworks is that they do not as yet recognise, let alone adequately address, this essential layer - *the means* - which acts as the information generation link between a served human activity system's functions and the supporting application and computer systems. With these architectural frameworks, application systems are widely viewed as synonymous with information systems, but we now know they are not.

From an epistemological perspective, process-oriented (or SDLC-based) methodologies, which focus on application software and to some extent ICT infrastructure development, still serve as a basis for the approaches adopted to manage the delivery of solutions. Even as organisations have moved away from in-house to out-sourced software development and a preference for packages, the approach to solution delivery has continued to be informed by these process-oriented methodologies, with extensions that particularly focus on control mechanisms, such as, progress toll-gates and governance. However we now know that each intervention needs to cover the simultaneous introduction of an information system and its relevant sub-systems. As such, within each of the broad functional categories (i.e. problem investigation and analysis, solution design, adoption, acquisition and implementation) of any intervention, considerations for the *means* of interaction would have to be formally defined before the *mode* can be determined. Similarly, the *mode* would need to be defined before the *medium* can be determined.

On the basis of the distinguishing characteristics of the three systems discussed in the previous section, it can be argued that application and computer systems, being closed and deterministic, may in principle be commoditised while information systems, being open and dynamic, cannot. Even so, a large category of application systems demonstrates context-dependent characteristics, and may not be suitably commoditised in all circumstances. The software component of application and computer systems can generally be grouped into three categories as follows:

- Device drivers & managers – these facilitate an operator's ability to command and control the operation of hardware.

---

[5] Ontology refers to paradigmatic assumptions about the nature of 'things' – that is, *what* an object or phenomenon is assumed to be – in a target environment.

- Personal Productivity – these facilitate an end-user's ability to capture, store, manipulate, transmit and retrieve potential information
- Organisational Productivity – these facilitate an organisation's (via an authorised end-user) ability to capture, store, manipulate, transmit and retrieve potential information.

As a general rule, IT devices and software (i.e. device drivers & managers, personal productivity tools) that can be used in any context to support different activities within an organisation and across industries as well as geographical boundaries are context-independent, and usually cost-effective to buy.

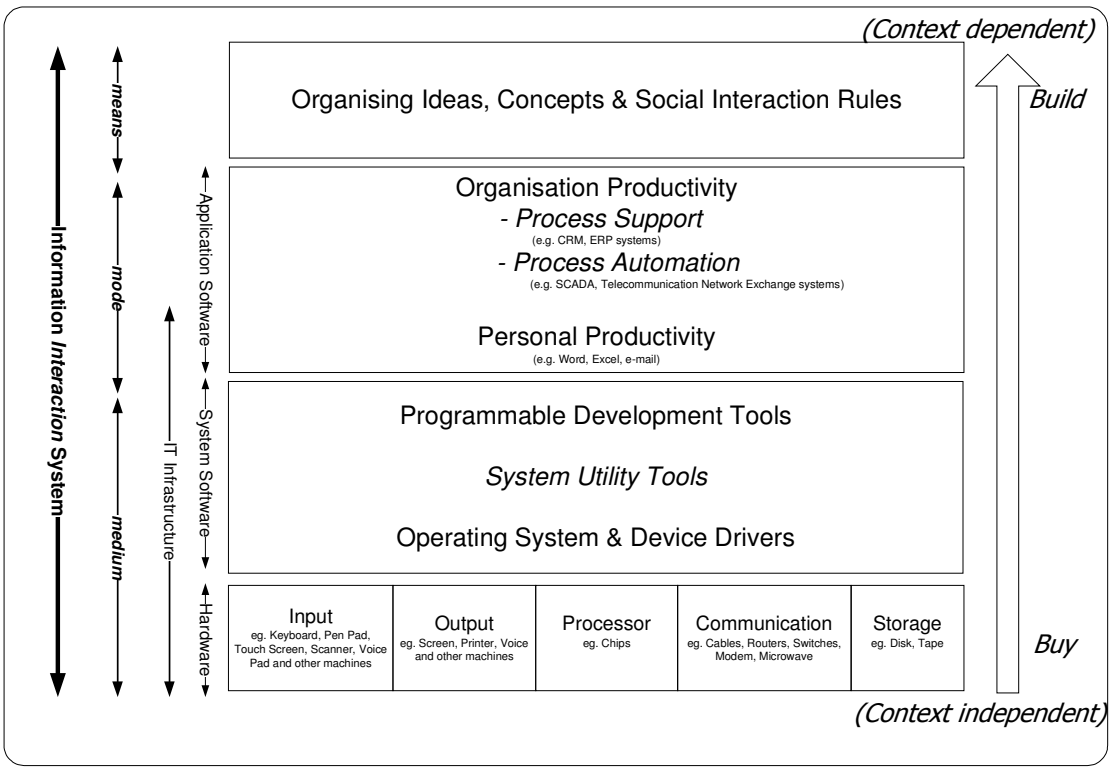

Figure 5: Information Resource Systems Hierarchy

As shown in Figure 5 above, beyond the context-independent software products however, there is myriad Organisation Productivity software, also predetermined but developed to suit particular contextual needs of the business organisation, and as such, strategic. Their assumed context forms a boundary around the targeted activities which they are intended to support, enable or automate in the served human activity system, and therefore need to be aligned with changing information needs. However, increasingly organisations have preferred to pursue a buy option, inadvertently relinquishing to vendor organisations, the responsibility for managing solution determination and with it, the whole idea of its 'coming into being', which incidentally focus on reducing uncertainty about the *means* of interaction (i.e. Information system) and its alignment with the served human activity system (i.e. Business Organisation) on the one hand, and the *mode* and *medium* of interaction (i.e. Computer and Application system respectively) on the other.

CONCLUSION

Typically, Business Organisations invest in IT interventions, expecting to gain the capabilities of an effective information *interaction* system (i.e. *means*, *mode* and *medium*). However, by relying on IT Organisations knowledge-base, which consists of the currently popular architectural frameworks and progression-centric approaches to solution delivery, organisations continue to experience wide variations between expectations and outcomes. More than that, Business Organisations are in danger of losing the ability to control their destiny, where information resource management is concerned.

In spite of the progress made in identifying favourable behavioural factors and governance for IT interventions, the high rate of failure to meet ongoing business expectations – hence Business-IT misalignment – when interventions are undertaken, is likely to continue while the focus of attention remains on *closed* application and computer systems whose roles are the *mode* and *medium* of interaction, at the expense of the *open* information system which subsumes both of these systems, and in addition, provide the *means* of interaction.

In this position paper, I have argued for the recognition of a separate system in the hierarchy of systems required for information interaction; the *means of interaction* (i.e. information system) which is currently, either unconsciously absorbed in the human activity system, or treated as interchangeable with the *mode of interaction* (i.e. application system), and as such, has not been explored for its unique linking role in sustaining Business-IT Alignment. The next step is to articulate a research program that explores the role of this shared understanding in managing IT interventions, and providing outcomes that would ensure continuing Business-IT Alignment.

REFERENCES

1. Chan Y 2002. Why Haven't We Mastered Alignment? The Importance of the Informal Organization Structure, *MIS Quarterly Executive*, (1:2).

2. Checkland P, Holwell S, 1998. *Information, System and Information Systems: Making Sense of the Field*, John Wiley & Sons.

3. Henderson J, Venkataraman N, 1990. Strategic Alignment: A Model for Organizational Transformation via Information Technology, *Center for Information Systems Research*.

4. Luftman J, 2000. Assessing Business-IT Alignment Maturity', *Communications of the Association for Information Systems*, (4:14).

5. Luftman J, Kempaiah R, 2008. Key Issues for IT Executives 2007, *MIS Quarterly Executive*.

6. Reynolds M, Holwell S, 2010. *Systems Approaches to Managing Change: A Practical Guide*, Springer.

7. Reich B. H., Benbasat I, 2000. Factors that Influence the Social Dimension of Alignment between Business & IT Objectives, *MIS Quarterly*, (24:1).

8. Silvius G. A. J, 2007. Business & IT Alignment in Theory and Practice, *Proceedings of the 40th Annual Hawaii International Conference on System Sciences*.

9. Tan F. B, Gallupe R. B, 1999 Research into Business-IT Alignment: Toward a Cognitive Perspective, *Proceedings of the* 10th *Australasian Conference on Information Systems (ACIS)*.

COPYRIGHT